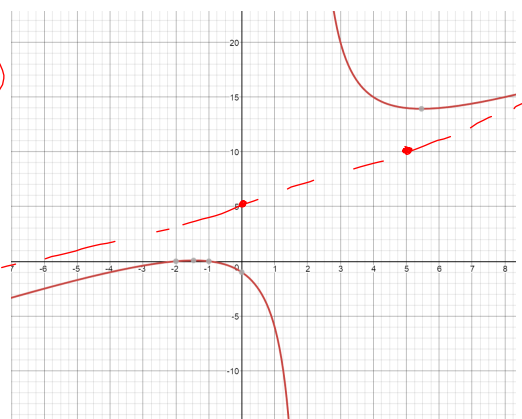


2.7 Graphing Rational Functions

Given: $y = \frac{x^2 + 3x + 2}{x - 2} = \frac{(x+2)(x+1)}{x-2}$



Higher Degree N/D?	$N > D$; <u>slant</u>
Asymptotes:	$x = 2$; $y = x + 5$
hole(s):	N/A
Domain:	$x \neq 2$
Range:	
x-int (s):	$(-2, 0)$ $(-1, 0)$
y-int:	$(0, -1)$
*Test Points:	$(1, -6)$ $(3, 20)$ $(-4, -1)$ $(4, 15)$

$$\begin{array}{r}
 x - 2 \overline{) x^2 + 3x + 2} \\
 \underline{-(x^2 - 2x)} \\
 5x + 2 \\
 \underline{-(5x - 10)} \\
 12
 \end{array}$$

Sep 14-7:49 AM

Characteristics of the Graph of a Rational Function

End Behavior Asymptote:

If N degree $>$ D degree: H.A.: Does not exist BUT...

the asymptote is the quotient polynomial function

If N degree $=$ D degree: H.A.: $y =$ ratio of leading coefficients

If N degree $<$ D degree: H.A.: $y = 0$

Vertical Asymptotes: What makes the denominator $= 0$.

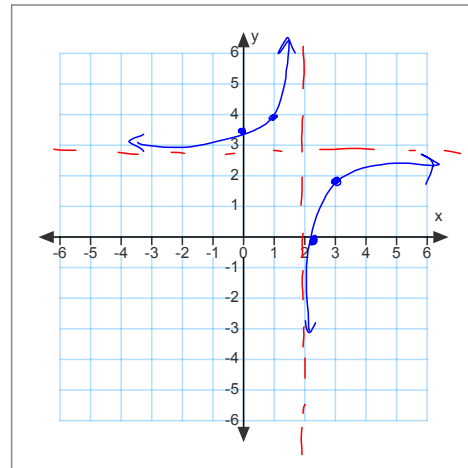
x-intercepts: What makes the numerator $= 0$.

y-intercepts: Find $f(0)$.

Oct 11-10:34 AM

$$1.) g(x) = \frac{3x-7}{x-2}$$

Higher Degree N/D?	$N=D$; $y=3$
Asymptotes:	$x=2$
hole(s):	None
Domain:	$x \neq 2$
Range:	
x-int (s):	$3x-7=0$ $x = 7/3$
y-int:	$(0, 3.5)$
Test Points:	$(3, 2)$ $(1, 4)$



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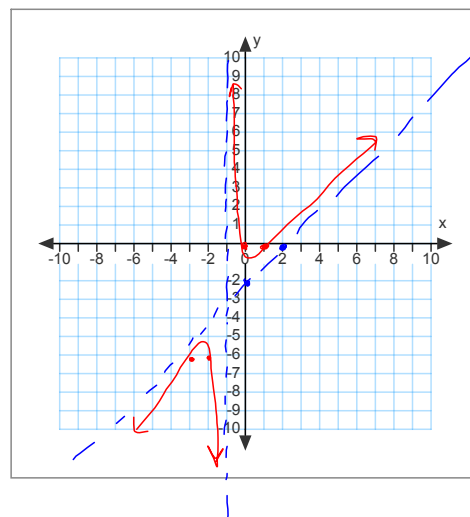
$$2.) f(x) = \frac{x(x-1)}{x+1} = \frac{x^2-x}{x+1}$$

$$x+1 \overline{) x^2-x+0}$$

$$\underline{-x^2+x}$$

$$-2x+0$$

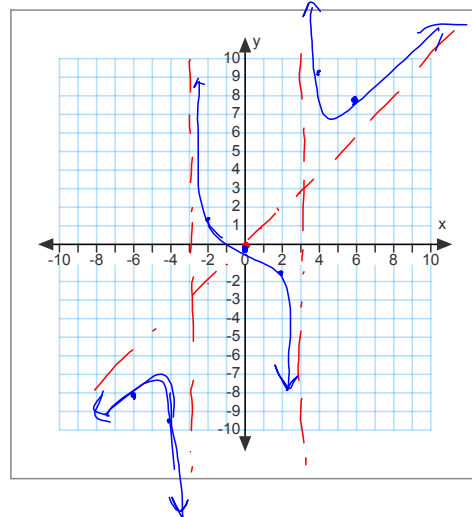
Higher Degree N/D?	$N>D$; slant
Asymptotes:	$x=-1$, $y=x-2$
hole(s):	None
Domain:	$x \neq -1$
Range:	
x-int (s):	$(0,0)$ $(1,0)$
y-int:	$(0,0)$
Test Points:	$(-2, -6)$ $(-3, -6)$



Oct 11-10:50 AM

$$3.) f(x) = \frac{x^3}{x^2 - 9} = \frac{x^3}{(x+3)(x-3)}$$

Higher Degree N/D?	$N > D$; slant
Asymptotes:	$x = 3, x = -3, y = x$
hole(s):	None
Domain:	$x \neq \pm 3$
Range:	
x-int (s):	$(0, 0)$
y-int:	$(0, 0)$
Test Points:	$(-6, -8) (-2, 1.6)$ $(-4, -9.1) (2, -1.6)$ $(6, 8) (4, 9.1)$

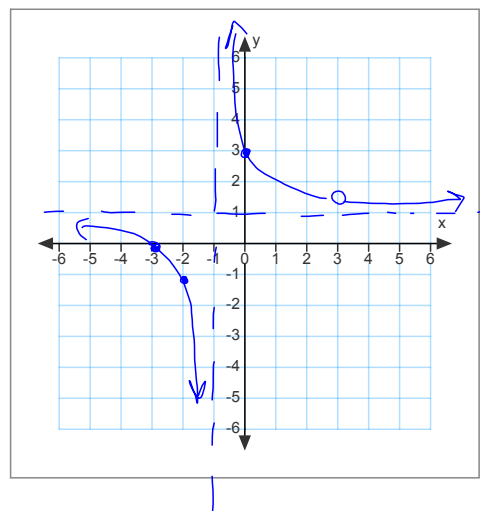


$$\begin{array}{r} x \\ x^2 + 0x - 9 \overline{) x^3 + 0x^2 + 0x + 0} \\ \underline{-x^3 + 0x^2 - 9x} \\ 9x + 0 \end{array}$$

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$$4.) f(x) = \frac{x^2 - 9}{x^2 - 2x - 3} = \frac{(x+3)(\cancel{x-3})}{(\cancel{x-3})(x+1)}$$

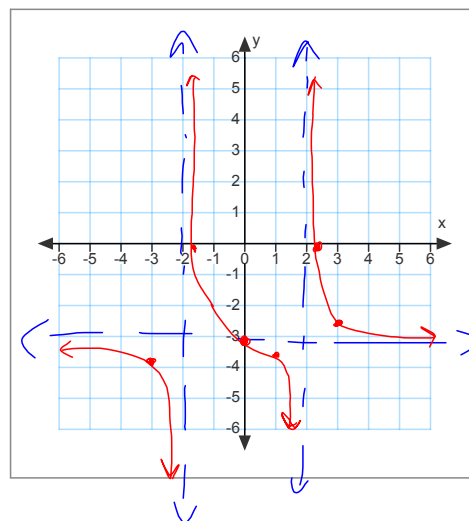
Higher Degree N/D?	
Asymptotes:	$x = -1 \quad y = 1$
hole(s):	@ $x = 3 \quad (3, 3/2)$
Domain:	$x \neq 3 \quad x \neq -1$
Range:	
x-int (s):	$(-3, 0)$
y-int:	$(0, 3)$
Test Points:	$(-2, -1)$



Oct 11-10:59 AM

$$5.) f(x) = \frac{-3x^2 + x + 12}{x^2 - 4} = \frac{-3x^2 + x + 12}{(x+2)(x-2)}$$

Higher Degree N/D?	$N = D$; ratio
Asymptotes:	$y = -3$ $x = \pm 2$
hole(s):	None
Domain:	$x \neq \pm 2$
Range:	
x-int (s):	
y-int:	$(0, -3)$
Test Points:	$(1, -3\frac{1}{3})$ $(-3, -3.6)$ $(3, -2.4)$



$$x = \frac{-1 \pm \sqrt{1 - 4(-3)(12)}}{-6}$$

$$x = \frac{-1 \pm \sqrt{145}}{-6} = \left(2.1736, 0 \right)$$

$$\left(-1.8403, 0 \right)$$

Oct 11-11:00 AM

May 5-7:47 AM